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President's Column

PAUL L. SHALLENBERGER, M.D.
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ENDOSCOPY

One of the major medical advances of this century has been the development of endoscopic procedures. Rigid tube endoscopy, except for bronchoscopy, has been modified by the use of flexible tubes and the addition of efficient optical systems and biopsy tubes, or channels with appropriate instruments for biopsy. One group of clinicians is concerned with classification and diagnostic labeling of disease, while another group devotes themselves to new instruments and additions or changes in existing instruments and techniques. Any field of medicine must by necessity have both pioneers and the practitioners so that eventually instruments for practical use will appear. Present day endoscopy of the intestinal tract, in spite of the reservations held by some clinicians, has reached a practical level of clinical use in diagnosis. Complications of endoscopic examinations are increasingly rare.

Indications for endoscopic examinations are often confusing to the clinician because of the various motives behind the use of these procedures. The suggestion for gastroscopy or esophagoscopy often comes from x-ray or because some aspect of the history or physical examination is confusing. A look into the esophagus or stomach may therefore be indicated in removing some of the diagnostic confusion. In considering the indications such factors as explanation of symptoms, or to review healing of a benign lesion, or to determine differential diagnosis of tumors, or to pinpoint sources of bleeding are all good indications for visual inspection. Too often, however, idle curiosity or the excuse of training need, or in some cases, an examination just to be doing something are certainly less substantial reasons for the examination. Any considerations of endoscopy must start at a patient level and be concerned with explanation of symptoms. We attempt to evaluate accuracy by comparing x-rays, visual procedures of endoscopy, and histological examination of biopsy tissue. These are, of course, all necessary and of great value in classification. Word description of symptoms by the patient is often inaccurate and at times medical interpretation of this description may be distorted.

The term, gastritis, is so loosely used by many clinicians that it seems to me to have lost most of its meaning. I am sure that those with any long-time experience in clinical medicine and gastroscopy are well aware of the many changing concepts on the term, gastritis. In the earlier days of roentgenology and post mortem examination, any stomach containing visible large rugal folds, or no visible rugal folds, or on microscopic examination containing evidence of inflammmation, was classified as gastritis. Dr. Schindler's monumental work with the development of the gastroscope and his classification of the appearance of the stomach surface are well known and invaluable to all of us. This certainly forms one of the compartments of usefulness that gave early prominence to gastroscopy. When pieces of tissue that we visualized could be obtained under direct vision or at random, it rapidly became apparent that what we saw on the surface was not always found in the tissue under microscopic examination. It then became evident that gastritis as visualized on the surface was not necessarily a constant picture. Gastritis certainly is an entity, but we are far from being able to classify it at this time. Dr. Schindler, as well as many observers, have continued to investigate, observe and report in this field, but we are unable to correlate all of these factors into a valid classification of disease or explanation of symptoms.

Alteration in physiology and secretion with change in motion are factors we no not evaluate to any degree at this time. Cytology and microscopic study of debris, or tissue slough, or debridement further helps in reducing our study to the level of cell appearance, but this also adds other elements of confusion. Diagnosis of tumor may well be improved by these various methods, but for a complete explanation of symptoms, we need more information from a basic level of human physiology. Classifying gastritis could probably be done in a fairly satisfactory manner with our existing information, but this is only a small step in our basic concept of symptom explanation. Biochemical methods, particularly microchemical analysis, seems now to be coming into the "golden era".

Endoscopy should and can remain a fundamental step in this program. X-ray studies, fluoroscopy for motion, and film for detail, have not and cannot be replaced by direct vision of the surface and this in turn cannot be replaced by a biopsy examination of tissue or by surgical exploration and organ removal. Accuracy in diagnosis is the aim of endoscopy and it will continue to be a useful tool replacing nothing but adding to our knowledge of the individual sick patient.

LEIOMYOMA OF THE ESOPHAGUS

Case Report and Review of the Recent Literature

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The purpose of this paper is to re-emphasize the typical course and clinical characteristics of esophageal leiomyomata. There are several excellent reviews in the medical literature[1,2,3]. A large number of these tumors are asymptomatic[2,5] and are found coincidentally during investigative studies for other reasons[4,6] as exemplified by the summary of the following case.

CASE REPORT

This 31-year-old white male was admitted to the Atlanta VA Hospital for the second time on 1/27/60 for treatment and evaluation of grand mal seizures for which he was being treated with dilantin and phenobarbital. Because of vague abdominal complaints suggestive of peptic ulcer symptoms, an upper gastrointestinal series was done and was interpreted as showing a shallow lesser curvature prepyloric ulcer. On this x-ray study it was also noted that there was a probable filling defect of the terminal esophagus. Repeat studies revealed a filling defect of the terminal esophagus consistent with an intramural, extramucosal tumor suggestive of leiomyoma (Fig. 1). The remainder of the physical examination and laboratory findings were within normal limits. Subsequent gastro-intestinal radiography revealed prompt healing of the gastric ulcer on standard medical therapy.

FIG. 1. Barium swallow showing well defined defect, normal lumen above and below, and intact mucosa passing over the lesion.

The patient did not complain of dysphagia on admission but subsequent questioning revealed that he had noticed some difficulty in swallowing bulky foods such as bread with a sensation of food sticking in the region of the terminal esophagus. Esophagoscopy with an Eder-Hufford esophagoscope under topical anesthesia was done. Approximately 3-4 cm. above the cardioesophageal junction there appeared a smooth rounded mass protruding into the lumen from the posterior aspect of the esophageal wall. The overlying mucosa appeared intact, and the instrument was passed through the gastroesophageal junction with ease. The lesion had the appearance of a typical extramucosal tumor of the lower esophagus.

Approximately six weeks after admission, surgical removal of the lesion was performed through a left lateral thoracotomy incision and two lesions were removed by blunt dissection from the lower esophagus through mucosal incisions. This was an uneventful operative procedure which the patient withstood well. He had a normal postoperative course. The pathological examination of the lesions showed homogeneous architecture of interlacing whorling bundles of spindle-shaped cells with oval nuclei compatible with smooth muscle. There was no evidence of malignancy (Fig. 2).

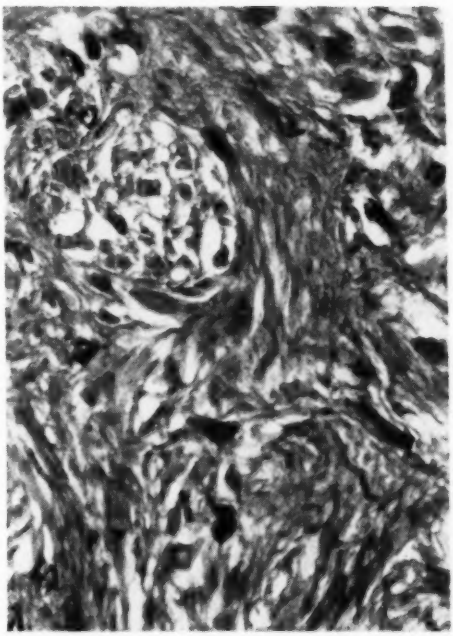

FIG. 2. High power view of histologic section showing typical, benign smooth muscle tumor.

A repeat upper gastro-intestinal radiographic study some three weeks postoperatively revealed a normal esophagus.

DISCUSSION

Leiomyoma is the most common benign tumor of the esophagus. There are now several hundred documented cases in the world literature and the lesion is being diagnosed with increasing frequency. Autopsy incidence is usually stated to be 0.4 to 0.5 per cent[4,6]. Among benign tumors of the esophagus the incidence of leiomyomata is reported to be 50-70 per cent[2,3].

Sex distribution is generally reported to be 2:1, males to females[1,2,3]. The tumors are most frequently seen during middle age, although cases in younger individuals have been reported. Eighty-eight per cent of the cases occur in the age group 20-60, about 50 per cent occurring over the age of 40[1]. The average age of patients operated on is about 40 years[1,4].

Leiomyomata occur most frequently in the lower third of the esophagus with an incidence of about 58 per cent. Thirty per cent occur in the middle third, 6 per cent in the upper third, and the remainder are multiple scattered lesions. These figures approximate those reported by Lewis and Maxfield[3]. The intramural lesions are usually located in the more distal esophagus while the pendunculated, polypoid lesions occur more proximally[4].

The most common symptom attributable to the lesion is dysphagia[1,2,3,5]. Patients frequently also complain of a sensation of substernal pressure or pain[3] and if the lesion becomes large enough to compress adjoining structures, bronchopulmonary symptoms may also be noted.

Diagnostically, the most accurate method is radiographic demonstration of the lesion. The characteristic appearance of intramural esophageal lesions on barium swallow is well defined and has been described by various authors [7,8]. The usual features are a symmetrical, well defined, crescentic filling defect with normal caliber lumen above and below the lesion and intact mucosal folds passing undisturbed over the tumor mass. Occasionally the lesion may be seen as a soft tissue density on plain film of the chest.

Esophagoscopy is always indicated to confirm the intramural nature of the lesion[1,3]. Endoscopically the lesion is seen as a smooth mass bulging into the esophageal lumen with intact mucosa being thinned out or flattened over the surface of the mass. Biopsy would appear to be contraindicated except when there is evidence of intrinsic mucosal disease[1,3]. Biopsy is frequently non-diagnostic and may introduce infection which may render later enucleation more difficult. Occasionally there is congestion or ulceration of overlying mucosa, probably as a result of pressure[3].

Most authors are in agreement that the treatment of choice is surgical removal at the time of diagnosis. These lesions continue to grow and progressive dysphagia and eventual obstruction of the esophagus will ensue. The pedunculated or polypoid lesions occurring in the more proximal portion of the esophagus tend to ulcerate and bleed and should be re-

moved for this reason[4]. Malignant degeneration is apparently rare and although there is no definite evidence relating benign esophageal leiomyomata and the later development of leiomyosarcoma[1,3] Story and Adams feel the lesion should be surgically treated at a time when it is curable rather than wait until a time when potentially curable treatment would be less effective[1]. Two examples of areas of sarcoma in otherwise typical myomata are quoted by Lewis and Maxfield.

SUMMARY

A typical case of esophageal leiomyoma successfully treated by surgical removal is reported.

A brief review of the pertinent characteristics of this benign esophageal lesion has been presented.

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LEIOMYOSARCOMA OF THE STOMACH

A Case Report with Gastroscopic Observation

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Encino Medical Plaza
Albuquerque, New Mexico
January 29, 1960

An opportunity to observe a leiomyosarcoma through the gastroscope is rarely had by even the most experienced gastroscopists. In addition, there is some confusion in the literature as to the ability of the endoscopist to distinguish the leiomyoma from the leiomyosarcoma. The following case report represents one of those rare opportunities and also illustrates the impossibility of identifying malignancy in the submucosal lesion.

CASE HISTORY

This 58-year-old white female school teacher was referred to the hospital on October 10, 1958. She was in excellent health until two weeks prior to admission when she was awakened about 5 a.m. with a sudden onset of copious diarrhea. She had five stools in a four-hour period and the last stool was noted to be black. The character of the other stools was not noted. During the first morning she noted nausea, but did not vomit. The nausea persisted to some degree for ten days before clearing. Shortly after the onset of symptoms she noted weakness, faintness and a chilly feeling but had no fever nor chills. There was a diffuse abdominal discomfort of a vague nature. Prior to these symptoms she had been in excellent health with no food intolerances and was able to eat anything she wished including Mexican foods. She at no time had symptoms suggestive of other gastrointestinal disease and the past history was entirely noncontributory.

Physical examination was entirely normal with the exception of pallor and a firm, mov-

able, nontender, orange size mass palpable in the left hypochondrium.

Information that came with the patient from her referring doctor indicated that she had a severe anemia with less than 2,000,000 red blood cells. This was partially corrected prior to admission at which time she had a hemoglobin of 10.3 gm., hematocrit 30% PCV and a normal total leucocyte count and differential count. The gastric analysis revealed no free acid, but, after histamine stimulation, there was 10 degrees free acid present. Other laboratory tests were within normal limits.

The gastrointestinal X-ray revealed the esophagus to be normal. The stomach was median in position. A 5x6 cm. submucosal fairly well circumscribed mass was seen in the media of the stomach on the posterior wall and greater curvature aspect. There was very suggestive evidence of an ulcer crater on the medial superior aspect of the mass. The impression was a large submucosal tumor, probably leiomyoma.

Gastroscopy was carried out using Sodium Amytal, Demerol, and 5% Cyclaine, topically. The Eder Gastroscope was passed with ease. The stomach oriented in a manner suggestive of anterior displacement and right rotation, so that the angulus, the antrum and pylorus appeared when the handle of the gastroscope was in the 1 o'clock position. Excellent visualization of the angulus, antrum and pylorus was obtained and the mucosa appeared normal. Just above the midportion of the stomach on the greater curvature was a large rounded mass projecting into the lumen of the stomach with bridging folds of mucosa extending on to the tumor mass. The mucosa overlying the mass was pale, but otherwise not abnormal. An ulcer crater was seen near the apex of the tumor. The crater was oval with smooth borders and a red base. The mucous lake was clear without evidence of bleeding. The remainder of the mucosa appeared normal. The gastroscopic impression was "A submucosal tumor mass with ulceration, most likely leiomyoma".

At surgery a 5 cm. intramural mass was found on the posterior wall near the greater curvature. (See Fig. 1) There were implants

FIGURE I

The exogastric mass and the peritoneal implants as seen at surgery.

in the omentum ranging from 2 mm. to 1½ cm. in size. There were several 1-2 mm. implants in the mesentery of the small bowel and in the serosa of the small bowel. There were 2 nodules found in the liver. The lymph nodes along the lesser curvature were slightly enlarged to 3-4 mm. in diameter. A three-quarter subtotal gastric resection was done with a Bilroth I anastomosis.

The Pathologist described a 5 cm. intramural tumor mass which raised the mucosal surface and was surmounted by a hemorrhagic 1 cm. ulcer. (See Fig. II) The serosal surface was not involved over the tumor mass.

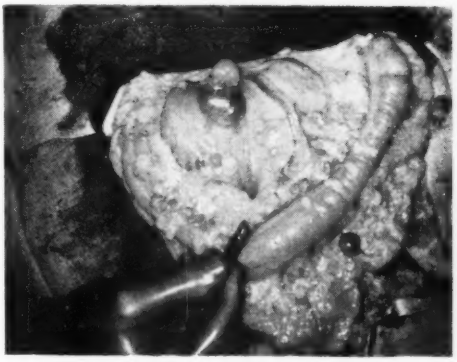

FIGURE II

The mucosal surface of the resected portion of the stomach is shown. The tumor mass, the ulcer at the apex of the tumor and the "bridging folds" are readily identified.

Microscopically, an irregular cellular pattern was noted and the cells were elongated with oval to fusiform nuclei. The nuclei were hyperchromic and enlarged. Scattered mitotic figures were present. Section of the stomach adjacent to the tumor showed a normal gastric wall without inflammation or neoplastic change. Sections of the metastatic lesions showed a bizarre cellular pattern in which occasional areas suggestive of laminated smooth muscle were present. The nuclei were enlarged and bizarre with scattered mitotic figures and an occasional greatly enlarged pleimorphic nucleus. The microscopic diagnosis was "Leiomyosarcoma of the stomach with regional metastases".

The post-operative course was uneventful and the patient soon returned to her former occupation. The one-year follow-up indicated she was in excellent health with no gastrointestinal symptoms.

DISCUSSION

The leiomyoma is usually an innocent tumor of smooth muscle. It is extremely common in the uterus and is often seen in the stomach and less often seen in the intestine, ovary, tubes and broad ligaments. The tumor may be of any size and it is usually firm and encapsulated. The cut surface has a whorled appearance and degenerative changes, such as hyaline or mucoid degeneration, softening and sometimes calcification, are common. Microscopically, the leiomyoma is made up of interlacing bundles of smooth muscle fibres separated by varying amounts of fibrous tissue. Rarely, the tumor may become malignant with larger nuclei, mitotic figures, loss of polarity, pleomorphism and metastases. It is often difficult to establish malignancy in these tumors.[1] Borrman[2] stated that leiomyomas originated from displaced embryonic cells.

The frequency of leiomyoma of the stomach is not commonly recognized. Rieniets[3] examined the stomachs from 200 consecutive autopsies carefully by palpation and found that thirty-two contained one or more leiomyomas. Meissner[4] examined stomachs from fifty consecutive autopsies by removing the berosa and placing the stomach mucosa surface down on a smooth surface and found that twenty-three of the fifty contained one or more leiomyomas. The most common size was from 0.4 to 0.6 cm. in diameter. The tumors were of equal incidence in male and female, were most frequent in the fundic portion and were indistinguishable from leiomyomas of the uterus even to showing similar hyaline changes and calcification. Thus, from 16% to 46% of stomachs contain leiomyomas. Fortunately, these small lesions are not clinically significant.

Minns and Geschickter[5] collected 931 cases of benign tumors of the stomach and found that 36.6% were leiomyomas. Eliason and Wright[6] found, in 560 cases of benign tumors of the stomach, 57.3% to be of the leiomyoma group. Marshall and Meissner[7] reported on a series of nineteen leiomyomas. During the period these were collected, there were 1171 operations for malignant gastric tumors and forty-eight benign gastric tumors. There were forty-one cases of gastric sarcoma including nine leiomyosarcomas (22% of the sarcomas). Of the forty-eight benign gastric tumors, nineteen were leiomyomas (40%). They made an interesting observation in that six of the leiomyomas had other gastric lesions: peptic ulcer, polyps or carcinoma.

Thompson and Oyster[8] reviewed ninety-four benign tumors of the stomach and found that twenty-two (23%) were leiomyomas. Seven of these were symptomatic clinical cases and fifteen were incidental autopsy findings.

France and Brines[9] and Lahey and Colcock[10] believe that leiomyosarcomas originate in previously benign leiomyomas. Meissner[4] also feels that leiomyosarcomas have their origin in leiomyomas and cites a case of leiomyosarcoma in which two small leiomyomas were present in the muscularis of the stomach adjacent to the sarcomatous lesion. Chaffin[11] suggests they originate in unchecked smooth muscle proliferation during the healing of chronic peptic ulcer.

Leiomyosarcoma is a rare tumor and probably originates in the commonly occurring leiomyoma. Ripstein and Flint[12] noted that only 202 cases of leiomyosarcoma of the gastroin-

testinal tract have been reported and they added twelve cases of their own. Giberson et al[13] noted that only 135 cases of leiomyosarcoma of the stomach have been reported. They point out that 98% of malignant tumors of the stomach are carcinoma and 2% the various sarcomas, of which about 25% are leiomyosarcomas. Marshall and Meissner[14] in their series of 1171 operations for malignant tumors of the stomach found sarcomas in forty-one, an incidence of 3.5%, and leiomyosarcomas in nine, 22% of the sarcomas. Thompson and Oyster[8] found that of twenty-six cases of sarcoma of the stomach, seven (26.9%) were leiomyosarcoma.

There is little to distinguish leiomyoma from leiomyosarcoma of the stomach clinically. The presenting complaints are chiefly those of (1) abdominal distress, frequently in the left upper quadrant and often mimicking peptic ulcer, (2) gastrointestinal bleeding and (3) tumor mass.[7,8,12,15,16] The orifices are rarely involved so that obstructive signs are infrequent. The small intramural lesions are asymptomatic and are found only as incidental findings at surgery or autopsy. As the lesions become larger they may protrude exogastrically making themselves known as a palpable mass or endogastrically leading to stretching and thinning of the mucosa and eventually ulceration and bleeding. The degree of bleeding may be from occult melena to exsanguinating hemorrhage. An unusual case report is that of Read[17] in which a leiomyoma broke off from a degenerated stalk and lodged in the jejunum causing intestinal obstruction. Altho some are reported to produce an infiltrative lesion[18] most reports indicate that invasion is rare and the tumors may be readily approached surgically.

The treatment of the leiomyosarcoma is surgical and even the largest tumors are operable since infiltration is rare. Metastases, when present, are usually in the liver or peritoneum and only rarely reported in other sites.[15] The lymph nodes are rarely involved. Even when metastases are present, the primary lesion should be removed since the lesions are usually slow growing and many years of relative well being may result.[1] Even the largest of exogastric tumors, which appear inoperable at first inspection, can be removed and a good result obtained.[19] Giberson et al[13] report a five-year survival rate of 53.8% of 26 patients. Radium implantation, nitrogen mustard and Roentgen therapy have no place in the treatment of these lesions.[13,16,18,20]

Reports of gastroscopic observations of these tumors are rare. Palmer[21] collected ten gastroscopically observed cases[20,22,23,24] to which can be added one case reported by Cornell[25] and three cases reported by Giberson et al.[13]

The small intramural lesion cannot be identified by the gastroscope because of the intact mucosa overlying. When the mass protrudes endogastrically, or becomes ulcerated, it can be identified as a submucosal tumor. Schindler et al[20] and Schindler[26] state that the findings suggesting leiomyosarcoma are (1) large soft tumor masses, (2) a smooth rounded tumor and (3) one of several "bridging folds". Palmer[18] describes intramural infiltration with prominent smooth ulcerating hemispheric nodules with increased translucency of the overlying mucosa. The "bridging folds"[27] are the most important feature to recognize in differentiating mesenchymal from epithelial tumors. In the mesenchymal submucosal tumors, the mucosa is stretched over the tumor leaving one or more bridging folds of mucosa traversing the sulcus between the base of the tumor and the surrounding normal mucosa.

This case showed the bridging folds, a soft conical tumor mass with the peculiarly translucent appearance of the overlying mucosa and surmounted by a smooth blood clot-filled ulcer crater. Because of these features and the lack of signs of infiltration, the lesion was diagnosed as a leiomyoma at the time of gastroscopy. Surgery showed numerous peritoneal metastases and the pathology of the tumor was that of leiomyosarcoma.

SUMMARY

Leiomyosarcoma of the stomach is a rare tumor and there are very few gastroscopic observations reported. The case reported here illustrates such a case and shows that there

are no diagnostic criteria to distinguish leiomyosarcoma from leiomyoma. However, the tumor can be identified as submucosal (Mesenchymal) in origin and, no matter how large or inoperable the mass may seem, surgery is mandatory, with expectation of removal of the mass and 50% five-year survival.

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GASTROSCOPY AS AN AID IN THE DIAGNOSIS OF SMOOTH MUSCLE TUMORS OF THE STOMACH:

Report of Two Cases*

Maurice L. Kelley, Jr., M.D.**

Although smooth muscle tumors of the stomach are not a rarity, their occurence is sufficiently unusual to prevent most physicians from becoming familiar with their clinical characteristics. These growths can produce symptoms and signs which are at times confused with more common conditions and they may, therefore, be easily misdiagnosed. Gastroscopy provides a useful ancillary method by which additional information, important in guiding proper treatment, may be obtained. The purpose of this report is to describe two patients in whom gastroscopic examination was of considerable help in the diagnosis of smooth muscle tumors of the stomach.

CASE NO. 1

A 68-year-old, white, widowed practical nurse was admitted to the Strong Memorial Hospital on January 22, 1957 because of increasing weakness, light headedness, blurring of vision and anorexia of six weeks duration. Black, tarry stools had been noted intermittently for three weeks. She had lost six pounds of weight. Otherwise, she had been in good health except that for twelve years she had experienced intermittent episodes of gnawing pain in the left upper abdomen. The pain usually occurred at night and was promptly relieved by milk or alkalis. X-rays of the upper gastrointestinal tract ten years prior to admission had been interpreted as negative. Her husband, brothers and only son had died during the past year and her employer, a wealthy blind man, made her job a "nerve-racking" one.

The blood pressure and other vital signs were normal. She was pale and appeared chronically ill. Except for a moderate degree of obesity and a grade 2 pan systolic cardiac murmer, no abnormal physical findings were noted. Abdominal examination was negative.

The blood Wassermann test was negative as was analysis of the urine. The hematocrit was 22 per cent and the hemoglobin 8.1 grams per 100 ml. The white blood cell count was 8700 with a normal differential. The red blood cells were hypochromic and showed a considerable degree of anisocytosis and poikilocystosis. Three stool specimens were tarry black in appearance. They gave a strongly positive reaction for occult blood by the guaiac test. A blood urea nitrogen, fasting blood sugar and other blood chemical analyses were normal. A tubeless gastric analysis showed the presence of free gastric acid.

An upper gastrointestinal series on January 23, 1957 was interpreted as indicating a persistant irregularity along the greater curvature of the stomach at about the mid portion of the fundus. (Figure 1) There was also a small sliding hiatus hernia and a diverticulum of the duodenum. Another x-ray study of the stomach was done on January 26, 1957 using a small amount of barium and Seidlitz powders. Again the impression of a polypoid

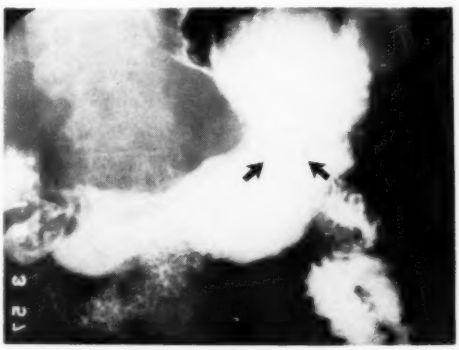

Fig. 1 — Case 1. Irregular filling defect in the mid-portion of the gastric fundus seen in the upper gastrointestinal series of January 23, 1957.

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lesion high on the greater curvature was suggested by the radiologist.

The patient was placed on an ulcer regimen and five blood transfusions, which raised the hematocrit to 40 per cent, were administered over a period of several days. It was felt that she probably had a carcinoma of the stomach.

A gastroscopy was performed on January 31, 1957. One-hundred mgms. of demerol, 0.13 gms. of sodium phenobarbital and 0.0006 gms. of atropine sulfate were given intramuscularly thirty minutes prior to the examination. One per cent pontocaine was used as the local anesthetic. Passage of an Ewald tube produced twenty ml. of clear gastric juice which contained flecks of red blood and gave a strongly positive reaction to Topfer's solution.

The gastroscope was introduced without difficulty. The angulus was seen immediately, but the pylorus did not come into view. On the lesser curvature and on the anterior gastric wall, two large accumulations of dark blood adhering to the mucosa were seen. No discrete lesion was visualized until the patient was moved to the posterior position. When this was done, a large, circumscribed, concentric mass on the posterior wall came into view with each inspiration. The edges of the lesion were raised. It seemed to be covered with normal gastric mucosa except for its central portion which was depressed and dark red in color suggesting ulceration. The surrounding mucosa was thinned and pale; small, branching blood vessels could be seen through it. The gastroscopic impression was that of a tumor of the posterior wall of the stomach, either a leiomyoma or a carcinoma with surrounding atrophic gastritis.

An exploratory laparotomy was performed on February 6, 1957 by Dr. Seymour I. Schwartz. A raised lesion, three cms. in diameter was found eight cms. above the pylorus near the greater curvature of the stomach. It was covered with smooth, pink mucosa and had a deep depression three mm. wide in its central portion. (Figure 2) The lesion was resected along with 70 per cent of the stomach and a Billroth I type of gastroduodenostomy was performed. Microscopic examination of the

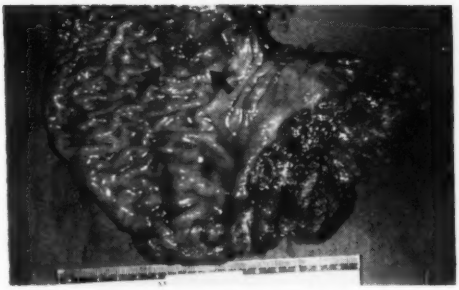

Fig. 2—Case 1. Leiomyoma with central ulceration found on the posterior gastric wall at operation, February 6, 1957.

tumor showed a nodular, submucosal leiomyoma composed of bundles of interlacing, uniform, spindle-shaped smooth muscle cells. A deep, cleft-shaped ulcer extended through the mucosa into the body of the tumor. (Figure 3) The surface of the ulcer was covered by necrotic debris and acute inflammatory cells. The submucosa surrounding the tumor was edematous and showed scarring with chronic inflammatory cell infiltration.

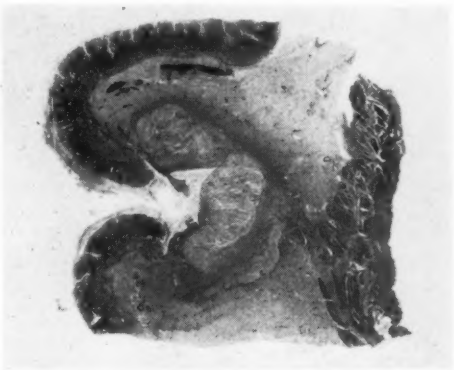

Fig. 3 — Case 1. Microscopic section of leiomyoma (low magnification) showing deep central ulceration. Hematoxylin and eosin stain.

The patient had an uneventful post-operative course except for an episode of auricular fibrillation and was dismissed from the hospital on February 15, 1957.

She was readmitted to the hospital in October 1958 because of a myocardial infraction from which she made a good recovery. No gastrointestinal symptoms were present. Her hematocrit was 43 per cent and the stools were guaiac negative.

CASE NO. 2

A 30-year-old, white housewife with three children was admitted to the Strong Memorial Hospital on March 22, 1960 under the care of Dr. Stanley B. Troup. The patient was referred to Dr. Troup, a hematologist, by her home physician because of severe hypochromic microcytic anemia of one year's duration. Her symptoms consisted of exertional dyspnea, dizziness, palpitations and irritability which had been present since the anemia was discovered one year prior to admission. Various oral and parenteral hematinic preparations as well as five blood transfusions had failed to effect any sustained response. She denied any gastrointestinal symptoms other than occasional, vague periumbilical discomfort not related to meals or anything else. Dark stools had been noted periodically, but were attributed to the oral iron preparations which she had been taking. Menstruation was not excessive and except for symptoms secondary to the anemia, she felt well.

The vital signs were within normal limits. Except for being extremely pale, no abnormal physical findings were noted. No palpable abdominal organs or masses were present.

The Wassermann reaction was negative. Urinalysis was unremarkable. The hematocrit was 23 per cent and the hemoglobin 8.5 gm. per 100 ml. The white blood cell count was 5000 with a normal differential. The red blood cells were hypocromic with marked anisocytosis and polychromatophilia. Many microcytes were present. A sternal bone marrow examination showed a generally hyperplastic marrow with erythroid hyperplasia. Three stool specimens were tarry black and gave a four plus reaction for occult blood by the guaiac test. A specimen of gastric juice obtained under fasting conditions gave a positive reaction to Topfer's reagent and its pH was 3.5.

An upper gastrointestinal series on March 23, 1960 revealed a large spherical filling defect along the lesser curvature of the stomach. In the distal antrum a similar, but smaller

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Fig. 4 — Case 2. Two spherical filling defects along the lesser curvature of the stomach noted in the upper gastrointestinal series of March 23, 1960. The lesion adjacent to the pylorus is less well demarcated than the more proximal lesion.

lesion was suggested. (Figure 4) These radiolucent areas were believed to represent either gastric polyps or some other type of benign neoplasm.

With the hope of further elucidating the type of lesions present, a gastroscopic examination was done on March 25, 1960. Premedication consisted of 75 mgms. of demerol, 0.13 grams of sodium phenobarbital and 0.0006 grams of atropine sulfate. Five per cent cyclaine was used to produce local anesthesia of the oropharynx. Twenty ml. of clear gastric juice containing flecks of brown, guaiac positive material was obtained by passage of an Ewald tube. The gastroscope was introduced without difficulty. The gastric mucosa was very pale, probably because of the patient's anemia. A considerable amount of brownish-black, dried blood was adherent to the mucosa throughout the stomach. Just at the angulus on the lesser curvature was a large, conical, nodular excrescence. Distal to this lesion and partially obscured by it was a similar tumor of smaller size. Although the mucosa overlying the lesions was pinker than the surrounding membrane, it was intact on the aspects of the tumors which were visible. No ulcerations were noted with the patient in either the left lateral or posterior position. The gastroscopic impression was that of two discrete, intramural tumors on the lesser curvature of the stomach, probably leiomyomata.

The patient's hematocrit was increased to 41 per cent by the intravenous administration of 2000 ml. of whole blood during the next several days.

An exploratory laparotomy was performed on March 28, 1960 by Dr. John H. Morton. On the posterior wall of the antral portion of the stomach there was a lobulated, intramural tumor measuring 3x3 cm. It presented a large nodular intraluminal mass and extended through to the serosa. A small separate lesion 3x2 cm. of a similar nature was located on the posterior wall closer to the pylorus. (Figure 5) The smaller tumor was entirely intramural, but over the apex of the intraluminal extension of

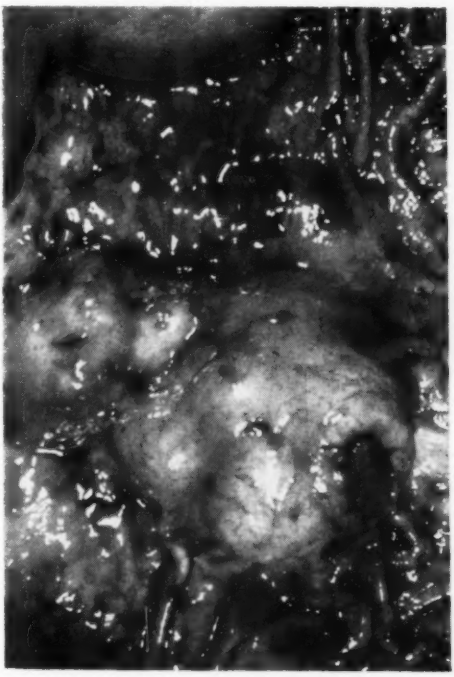

Fig. 5 — Case 2. Operative specimen illustrating the two lobulated tumors which on microscopic examination proved to be leiomyosarcomas. Only the larger proximal lesion was seen at gastroscopy.

the larger lesion there was a shallow punched out ulcer approximately two cm. in diameter. (Figure 6) The liver and other viscera appeared normal.

Fig. 6 — Case 2. Close-up of the larger proximal lesion showing the central ulceration. The ulceration could not be visualized at gastroscopy.

The two lesions along with approximately 50 per cent of the distal stomach were removed, and a Billroth I type gastroduodenostomy performed.

Microscopic examination showed both nodules to consist of very cellular proliferating tissue. In some areas the tumors were made up of spindle-shaped cells in whorled and palisaded formations. In other areas the cells were more epithelioid in character being large and uniform with round or oval vesicular nuclei. They were scattered in uniform sheets or between thin septa. A few giant and multinucleated forms were noted although mitotic figures were infrequent. Foci of hemorrhage and edema were seen throughout both lesions. A Masson trichrome stain showed the tumor cells to have the staining characteristics of muscle with very little collagen in the intercellular tissue. A lymph node from the greater omentum revealed no tumor tissue. The pathological diagnosis of both lesions was intramural leiomyosarcoma.

Except for considerable post-operative gastric hypomotility, the patient made an uneventful recovery and was dismissed from the hospital on April 13, 1960.

INCIDENCE

Benign gastric leiomyomas are recorded equally in both sexes with an age range of 7 to 90. Most of the cases occur between the ages of 31 and 70.[1] The average age of patients with leiomyosarcomas is about one decade younger than that for carcinoma of the stomach.[2] Palmer's two patients were only 21 and 23 years of age.[3] Schindler's patients were 26, 46, 56 and 60.[4]

Small leiomyomas of the stomach are found at autopsy rather frequently when a search for them is diligently carried out. Messiner[5] found gastric leiomyomas in 23 of 50 consecutive autopses by making a special effort to find them. The lesions were small (usually between four and six millimeters) and were most commonly present in the fundus. The incidence of gastric leiomyomas which manifest themselves clinically is much lower. In 1936, Minnes and Geschickter[6] collected 341 clinical cases of leiomyomas of the stomach in a review of 931 benign gastric neoplasms. Palmer[7] in 1951 found 610 published cases of benign gastric leiomyomas exclusive of the autopsy series of Rieniets[8] and Meissner.[7] Everts and Kazal[9] scrutinized the literature on this subject and suggest that leiomyomas constitute about 40 per cent of benign gastric tumors that produce clinical symptoms.

Leiomyosarcomas on the other hand, are apparently one of the rarest tumors of the stomach. They are thought to comprise from 10 to 22 per cent of all gastric sarcomas.[4,9] Since the frequency of sarcoma of the stomach as compared to that of carcinoma is said to be 1:1000, their occurence would seem to be quite infrequent.[10] Schindler et al[4] in 1946 collected 94 cases of gastric leiomyosarcoma from the literature and reported four patients of their own. In 1956, Morten et al[1] reported on ten patients with symptomatic smooth muscle tumors of the stomach seen at the Strong Memorial Hospital. Seven were benign and three malignant. At the Jefferson Hospital in Philadelphia, eleven patients with gastric tumors of smooth muscle origin were seen be-

tween 1948 and 1957. Seven were benign and four malignant.[9]

LOCATION

Gastric leiomyomas may occur in any portion of the stomach. Many of the articles in the literature indicate that the majority are located in the pyloric region; others have reported a higher incidence in the cardia while a third group has found that there is no predeliction for any special part of the stomach.[11] It appears that the location of smooth muscle tumors of the stomach, either benign or malignant, is quite variable.

PATHOLOGY

In 1941, Golden and Stout[12] published a classical review of the pathological findings in gastrointestinal leiomyomas. The tumors arise in the muscular coat of the stomach wall. They are circumscribed and usually single, although multiple tumors are occasionally present. The larger tumors may become lobulated. The growths are firm, round, rubbery nodules which are grey or pink on cross section with a whorled appearance. They are sometimes classified as submucosal or subserosal depending on the direction of their major growth.[13] As they are relatively avascular, central necrosis, cavitation and bleeding are common. Although the tumors are actually intramural, the degenerative changes often produce mucosal ulceration with gastrointestinal hemorrhage.

In a study of the gross pathological characteristics of 178 gastric leiomyomas, Palmer [7] found that the mucosa over the tumor showed a deep ulcer in 84. The overlying mucosa was normal in 60, atrophic in 17, superficially ulcerated in 14 and umbilicated and scarred in 3. Fifty-two of the lesions were pedunculated, 48 entirely smooth and 42 coarsely lobulated. Rugae mounting to the tumor were noted in 15 of the 178 lesions. An associated gastritis was found in 28.

Microscopically, leiomyomas are composed of spindle-shaped cells arranged in interlacing bundles. Palisading of the nuclei is often seen as are areas of focal necrosis. A true microscopic capsule surrounding the tumors is not present.

Considerable difficulty may be encountered in differentiating benign from malignant smooth muscle tumors. In leiomyosarcomas the muscle cells are not so fully differentiated and evenly formed as they are in benign leiomyomas.[4] The fusiform cells are often shorter or rounded and irregular in form and mitotic figures may be found. Leiomyosarcomas are generally of relatively low grade malignancy. Metastases are seldom present early and when they do occur, they are less extensive than those of carcinoma.[9] Metastases were found in 15 per cent of the series collected by Schindler et al.[4] They occur most frequently in the liver and may grow very slowly.

CLINICAL MANIFESTATIONS

The symptoms produced by smooth muscle tumors of the stomach, benign or malignant, are nonspecific and variable.[9] If the lesion is in the fundus, it may be silent but if located in the pylorus, it can be associated with intermittent obstruction. When ulceration occurs, the symptoms produced include burning epigastric pain, heartburn, hematemesis and melena. Many of the patients fall into one of the three clinical patterns.[4,9]

1. The presenting symptoms are hematemesis or melena or less frequently the result of chronic blood loss. Gastrointestinal bleeding of some type is the most common manifestation.

2. The presenting complaints consist of epigastric or upper abdominal pain or discomfort.

3. An abdominal mass is noted by either the patient or his physician.

The physical findings are usually negative except when there is a palpable abdominal mass or the effects of hemorrhage or chronic anemia are present. The only frequently noted laboratory findings are in those patients with a hypochromic, microcytic (iron deficiency) anemia and occult blood in the stools.

RADIOLOGIC DIAGNOSIS

Abrams[11] has summarized the x-ray findings produced by gastric leiomyomas as follows. These tumors produce a circumscribed filling defect over which the rugae are obliterated. The surrounding folds are normal and there is no disturbance in peristalsis. The fill-

ing defects are usually round or oval and sharply demarcated. There is no evidence of fixation or induration and the gastric wall is pliant. The lesion frequently forms an abrupt angle with the uninvolved gastric wall which aids in differentiating it from an extrinsic pressure defect. Ulceration is common but it is difficult to demonstrate folds converging toward the center of the crater, in contrast to the usual peptic ulcer. The ulcers are usually deeper than the ordinary peptic ulcer. Overfilling of the stomach with barium may obscure the tumor indicating the importance of compression films. Calcification of the tumor is occasionally seen in a plain film of the abdomen. (2 of the 41 cases collected by Abrams)

The roentgenographic impression in many cases of gastric leiomyoma is simply "tumor" or gastric carcinoma.[11] Although no specific x-ray criteria can be established, the demonstration of a smooth, round, sharply demarcated sessile gastric tumor with central ulceration, normal adjacent mucosa and normal peristalsis should suggest the possiblity of a gastric leiomyoma.

Gastric leiomyosarcomas likewise produce no specific radiographic picture. Of the 94 cases collected by Schindler et al[4] x-ray examination revealed a "filling defect" in 59 per cent, an "extrinsic mass" in 18 per cent, stiffness of the gastric wall in 11 per cent, an ulcer niche without filling defect in 8 per cent and in 4 per cent the examination was reported as being negative. In many cases the differentiation from carcinoma is impossible but the x-ray findings of a filling defect, plus a central ulceration plus fistulas should be suggestive of leiomyosarcoma.[4]

GASTROSCOPIC FINDINGS

According to Schindler,[14] the gastroscopic characteristics of leiomyomas are those common to other submucosal benign tumors including fibromas, myxofibromas, lipomas, osteomas and osteochondromas. The tumors are likely to appear as large, smooth elevations which are sharply defined and broad based. The sign of "bridging folds" wherein one or several mucosal folds are stretched from the surrounding mucosa up to the surface of the tumor "bridging" the space between the top of the tumor and the level of the surrounding membrane is felt by Schindler, Sandweiss and Minz[14] to be helpful in indicating the submucosal origin of these tumors.

Palmer[7] agrees that leiomyomas have no specific characteristics as seen at gastroscopy and present "only the features common to nonepithelial gastric tumors." He tabulated the gastroscopic features found among 17 patients with gastric leiomyomas reported in the literature. The surface configuration of the tumor was smooth in seven cases and nodular in three. The mucosa overlying the tumor was normal in color and texture in five, atrophic in two, congested and bleeding in two and abnormally pale in one. Rugae mounting to the summit of the tumor (bridging folds) were seen in two cases and atrophic gastritis elsewhere in the stomach in two. Although central ulceration is a common finding when the tumor is seen at operation or autopsy, the ulceration has not been seen with any regularity at gastroscopy.[7] This may be due to the fact that the lateral aspect of the tumors is usually seen, but an *en face* view is not ordinarily obtained as in one of our cases.

The first gastroscopic description of a leiomyosarcoma was given by Schindler and Letendre in 1942.[15] The gastroscopic diagnosis is seemingly very difficult. In none of the four cases described by Schindler et al[4] were these tumors correctly diagnosed by gastroscopy. As with leiomyoma, the impression of an intramural tumor is often gained by the gastroscopist. The mucosa overlying the tumor may be either pale or excessively red. Nodularity and ulceration are sometimes seen and, of course, suggest that the lesion is a carcinoma. The nodules are sometimes described as "soft" in appearance and the overlying mucosa may be succulent. A gastric polyp may also be erroneously diagnosed. In Schindler's four cases [4] the gastroscopic diagnoses were: 1. Polyposis. 2. Carcinoma most likely; however, a benign tumor especially myoma may be present. 3. and 4. Carcinoma of the stomach. Marked nodularity was visualized in cases 3 and 4.

As associated atrophic gastritis was noted in two cases and minimal hypertrophic gastritis in one.

Palmer[3] performed serial gastroscopies on two young soldiers with gastric leiomyosarcomas. The first patient initially showed extensive intramural infiltration suggesting malignant lymphoma but subsequent examinations revealed the development of nodules and an unusual translucency of the mucosa indicative of leiomyosarcoma. The other patient exhibited soft intramural 2x2 cm. nodules covered by translucent mucosa and a gastroscopic diagnosis of leiomyosarcoma was correctly made.

TREATMENT

The treatment of either leiomyoma or lyomyosarcoma of the stomach is surgical. Exploration is mandatory, unless specifically contraindicated, regardless of how strongly the roentgenograms and gastroscopy may indicate benignity.[11] Until microscopic examination of sections of the tumor can be made, the presence of a malignancy cannot be excluded. Furthermore, if the tumor is large enough to be seen by x-ray or gastroscopy, it is likely that bleeding will occur sooner or later. The majority of either benign or malignant smooth muscle tumors of the stomach have produced either bleeding or major symptoms by the time they are discovered by the physician and there is no question as to the advisability of surgical removal.

Lahey and Colcock[16] suggested that a high subtotal resection be carried out in all cases of gastric leiomyoma. Most authors, however, feel that a more conservative removal with a generous margin of normal stomach is sufficient.[1] The type of surgical procedure to be carried out in patients with leiomyosarcomas varies with the individual case. A subtotal gastric resection may suffice, but a total gastrectomy via a thoraco abdominal approach is at times necessary.[1] Roentgen therapy of leiomyosarcoma has been of little value.[3,4]

Successful surgical removal of a gastric leiomyoma should result in a cure. As pointed out by Morton et al,[1] the prognosis for gastric leiomyomsarcoma has never been well established. It appears that the outlook is better than with gastric carcinoma or lymphosarcoma. The Lahey Clinic in 1955[17] reported five year survival in 12 of 16 cases treated surgically. Jordan et al,[2] however, collected 103 patients from the literature and reached a five year survival figure of 37 per cent as compared to 27 per cent for 281 patients with gastric lymphosarcomas.

COMMENT

Both of the patients described in this report sought medical attention because of the symptoms of anemia secondary to bleeding from the gastric lesion. This is one of the most common ways in which patients with smooth muscle tumors of the stomach present and emphasizes the advisability of considering such a lesion when evaluating a patient with an iron deficiency anemia.[4,9] The presence of occult blood in the stools was helpful in focusing attention on the upper gastrointestinal tract in both patients. Case Number 2 was for some time treated for an iron deficiency anemia mistakenly thought to be due to excessive menstruation. Bleeding may have been more active in Case Number 1 as her symptoms secondary to anemia were of short duration. It seems unlikely that the ulcer-like pain which she had had for 12 years was due to the gastric leiomyoma.

Free gastric acid was demonstrated in both of our patients militating against the pre-operative diagnosis of gastric carcinoma. Abrams found that in 17 patients with gastric leiomyomas 10 had no free acid and 7 had "normal or high acidity." Gastric analysis was performed in three of the four cases of leiomyosarcoma reported by Schindler et al.[4] Two had free acid following histamine stimulation and one did not. It appears that there is no constant relationship of these lesions to gastric acidity. However, the presence of free acid may contribute to the ulceration and bleeding so characteristic of smooth muscle tumors.

Barium studies of the stomach in Case Number 1 indicated a polypoid lesion on the greater curvature suggestive of carcinoma. Gastroscopic examination indicated that the tumor was intra-

mural in origin and benign with central ulceration suggesting a leiomyoma, although a carcinoma could not be excluded. It is worth noting that the lesion could not be seen with the patient in the standard position, but came into view when she was moved to the posterior position. The usefulness of examining the patient in this position has been emphasized by others.[18]

In Case Number 2 the x-rays indicated two polypoid lesions whose circumscribed shape suggested benignity. Two lesions obviously of intramural origin were identified at gastroscopy. The overlying mucosa was smooth and the ulceration at the apex of the larger tumor found at operation could not be visualized. The gastroscopic impression was that of two leiomyomas of the stomach although the nodularity might have been taken to be indicative of leiomyosarcomas.

Dried blood on the stomach mucosa incriminating the gastric lesions as the source of bleeding was seen in both patients. This finding alone was of considerable help in confirming the site of bleeding. "Bridging" of the rugal folds as described by Schindler[4] and Palmer[7] indicating the intramural origin of the tumor was not observed in either case. Atrophy of the gastric mucosa was seen surrounding the lesion in Case 1 but not in Case 2.

A specific gastroscopic diagnosis was not made in either of our two patients, but an intramural smooth muscle tumor was strongly suspected in both cases, which was of help in guiding surgical therapy. Gastroscopy is of particular assistance in differentiating this sort of lesion from carcinoma.

Excision of the leiomyoma in Case 1 resulted in cessation of gastrointestinal bleeding and repair of the anemia. A similar response occurred in Case 2, but because of the malignant nature of the lesions, the long term prognosis must be guarded.

SUMMARY

Two patients with smooth muscle tumors of the stomach are reported. Both sought medical attention because of the symptoms of anemia secondary to upper gastrointestinal bleeding. A leiomyoma was found at surgery in one patient and leiomyosarcoma in the other. The clinical, roentgenographic, gastroscopic, pathological and operative findings are described together with comparable data from the literature.

Appreciation is expressed to Dr. Harry L. Segal and Dr. Victor W. Logan for their helpful comments in the preparation of this report.

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ABSTRACTS

Patterson, J. N., Oxsborne, G., and Tanner, N. C., Benign lesions of the pyloric antrum —value of gastrscopy. Brit. J. Radiol. 32: (373) Jan. 1959 pp. 1-6

The Radio Diagnostic Unit of Middlesex Hospital, London, England has described seven cases of benign lesions of the pyloric antrum, three of which had "Peptic Ulcer". In all of these cases there was concentric narrowing of the prepyloric area. These areas were thought to be an annular carcinoma, but gastroscopic visualization excluded neoplasm and revealed a benign condition. The "carcinoma-simulating" benign condition of the pyloric antrum was explained by fibrosis due to a healed gastric ulcer, the gall bladder adherent to the antrum, spasm or edema, or pathologically proven "pyloric hypertrophy". While the article emphasizes the importance of gastroscopy in excluding carcinoma, it would seem that mention or emphasis should also be placed on gastroscopic biopsy.

Martin Seler Kleckner, Jr., M.D.

Edward B. Benedict, M.D., Endoscopy (Medical Progress). N. Engl. J., Med., 260:478-85 and 535-542.

In a clear and systematic manner this medical progress report reviews the most important literature on bronchoscopy, esophagoscopy, gastroscopy, and peritoneoscopy for the four-year period 1955-59. In the section on the esophagus, 36 papers are reviewed in some detail with appropriate excerpts from some of these reports. Two new textbooks on the esophagus were published in 1958.

In the section on the stomach, 20 papers are reviewed in some detail. These are certainly the most significant studies of this four-year period, and several of them are well-known to readers of our journal. Several papers on peritoneoscopy and six papers on endoscopic photography are also reviewed.

With the accelerated progress of medicine in recent years, the field of endoscopy has also reached a very productive era. This review paper by Dr. Benedict does not pretend to cover every paper on the subject, but it is certainly required reading for those endoscopists who have mastered the basic techniques of their field and wish to review the progress which has been achieved in recent years.

Julius Wenger, M.D.

Anderson, M. N., Role of Endoscopy in Esophageal Hiatus Hernia. New York State Journal of Medicine Vol. 58: page 3283, October 1958

In hiatus hernia the chief use of the esophagoscope is in the differential diagnosis. Since treatment of hiatal hernia is different when the problem involved is regurgitation, esophagitis or stricture, an accurate diagnosis is necessary. This can be done best by direct vision. The esophagoscopy is a safe procedure when carried out by experienced operators, and should be used more often. It is especially useful in differential diagnosis and in order to choose the most appropriate therapeutic program.

Robert A. McNaughton

Friedman, E., and Katz, D., Endoscopy with the Flexi-rigid Esophagoscope. Post-graduate Med. v. 25 (3) Mar. 1959 pp. 274-6

Three hundred thirty-nine consecutive esophagoscopic examinations were performed with a flexi-rigid instrument in a group of 219 patients. More than one examination was performed in 48 cases. There were 17 incomplete examinations. The authors prefer the Eder-Hufford instrument. It was used for 217 examinations, the Schindler instrument for 96 and the Boros instrument for 26. Roentgenographic examination of the esophagus preceded esophagoscopy except in patients with recent upper gastro-intestinal bleeding.

No abnormality was seen during 123 of the examinations, and positive findings were noted during 199. The more common diagnoses were esophagitis (56), stricture (30), esophageal varices (27), carcinoma (20), hiatus hernia (20), esophagitis and stricture (14), cardiospasm (8) and esophagogastrostomy (5).

There was no morbidity and no mortality. Patients were examined in the left lateral decubitus position. Several examinations were done while the patients were in bed. Premedication usually consisted of pentobarbital sodium orally, atropine sulfate hypodermically and either morphine sulfate or meperidine sulfate hypodermically. Anesthesia of the pharynx was accomplished with 0.25 per cent solution of tetracaine hydrochloride or a solution of Benadryl hydrochloride or of Pyribenzamine hydrochloride. Food was permitted two hours after an examination. Outpatients were observed for two hours following examination.

Camen R. Paynter, M.D.

King, W. E., Gastroscopy, a review of 1100 cases. Med. J. Australia 46: vol. 1 No. 2. Jan. 10, 1959; pp. 49-51.

A series of 1100 gastroscopic examinations is analyzed. The Hermon Taylor instrument was used in the majority of cases but the author warns that the instrument is not safe to use in females over 50 years of age for fear of damage to the hypopharynx. The author considered the following as the main indications for gastroscopy: 1. to differentiate benign from malignant ulcers; 2. to diagnose acute gastric ulcers; 3. to determine the cause of hematemesis; 4. to elucidate the cause of dispepsia with negative x-ray findings; and 5. in prepyloric lesions.

A total of 272 chronic gastric ulcers were observed in this series. His criteria for gastroscopic examination in a patient with a gastric ulcer are: 1. to decide whether an ulcer is malignant; 2. to assess healing; and 3. to avoid false diagnosis.

The author reports between 1953-1954, gastroscopy was carried out on 55 patients with hematemesis and melena; in about 50% an acute or chronic ulcer was found. The author is disappointed in the gastroscopic findings in the field of gastritis. He recognizes three types of changes. 1. complete atrophy; 2. gross degrees of chronic superficial gastritis; and 3. the hypersecreting mucosa of a duodenal ulcer. The latter he terms "mammillation". He feels that hypertrophic gastritis is a rare entity.

Other less important indications for gastroscopy were 1. carcinoma of the stomach; 2. investigation of the stomach after operation; 3. gastritis; 4. duodenal ulcer, and 5. experimental work. The author emphasizes that combined radiology and gastroscopy increases the diagnostic accuracy by at least ten per cent.

Hugo C. Moeller, M.D.

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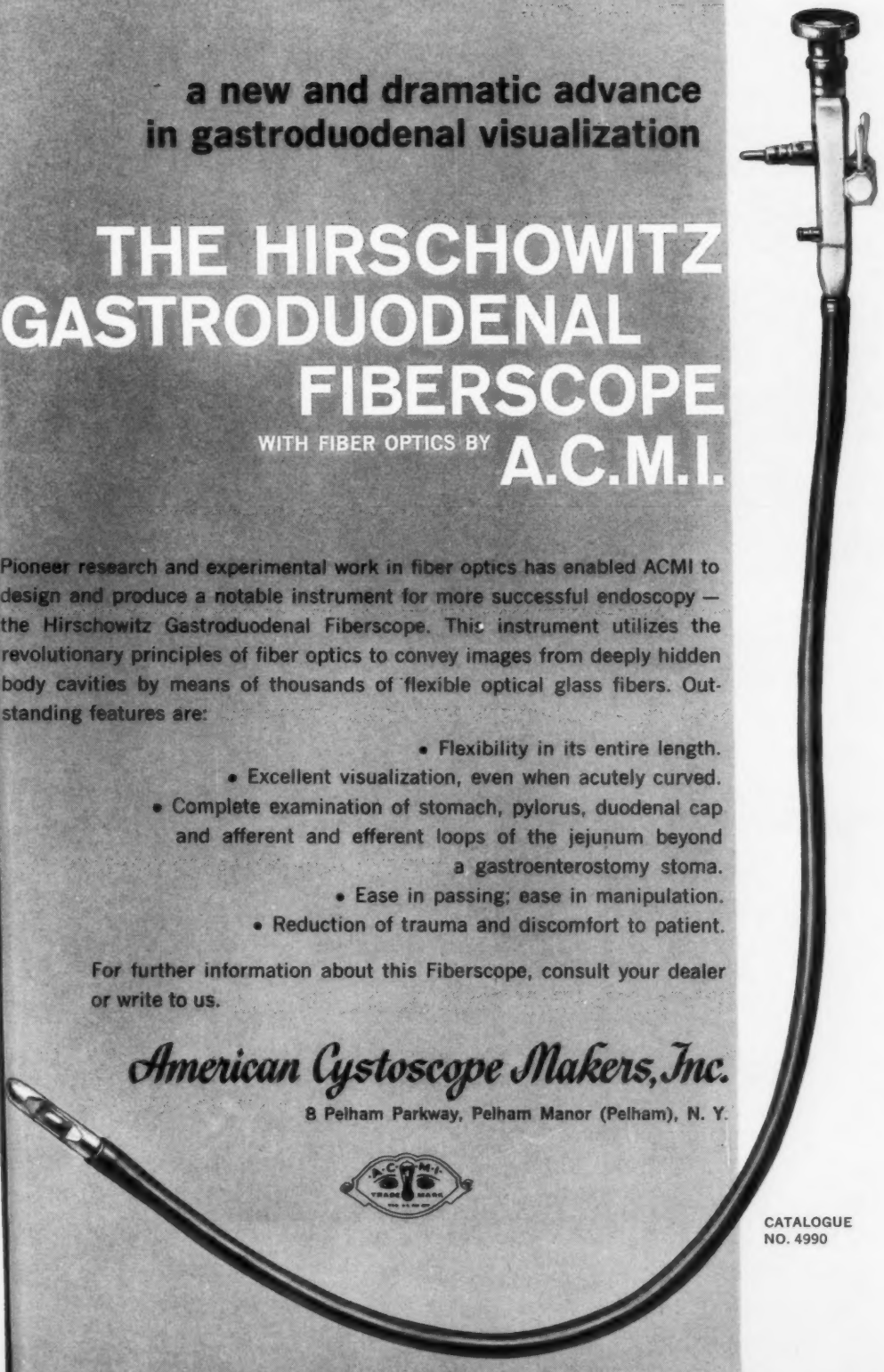

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- Reduction of trauma and discomfort to patient.

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CONVERSIONS. All Cameron and Metro Tec Gastroscopes can be converted to contact view or biopsy instruments.

The services and facilities of the Cameron organization are available to you, whatever your instrumentation requirements may be. We have been instrument makers for the Gastroenterologist for over twenty years. We hope we will have the opportunity of serving you soon.

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